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ABSTRACT

Five research projects concerning the Romanization of the Hebrew alphabet and its effect on the progress of adult English speakers learning Hebrew as a second language are reviewed. The hypotheses, subjects, procedures, results, conclusions, and validity of each study are summarized. The studies dealt with the Hebrew alphabet, spelling, plural forms, noun forms, and a measure of language ability. Introducing the learner to Hebrew by means of the Latin alphabet should eliminate the problems involved in learning a different alphabet and set of recognition techniques. Among the difficulties inherent in learning the Hebrew alphabet are that the language is written from right to left and that there are several pairs of identical letters that complicate spelling. A morpheme per utterance measure was developed and evaluated, and appears to be as valid for Hebrew as the mean length of utterance measure is for English. (RW)

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ROMANIZATION TO FACILITATE THE TEACHING OF MODERN HEBREW TO ADULT NATIVE SPEAKERS OF ENGLISH

A Research Portfolio

By
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INTRODUCTION

In all educational research, a review of the current research is of paramount importance in providing a basis for further research, a "state of the art" summary, to answer a question, and to summarize implications for the practitioner. Implications for the practitioner will be the theme of this particular portfolio of original research. It will also bear on the development and revision of a particular research and development product prior to operational field testing.[1]

In some ways, we are walking along a very well worn and traditional path. The teaching of the "Three R's," especially the alphabet, is not a topic new to educational practitioners. Developments over the years have been well documented and this research and development product is based upon a process approach to the teaching of Modern Hebrew, as a second language, for conversation. The novelty of this product is the utilization of the Latin alphabet to serve as the vehicle that will enable the beginning student to quickly master the sound system of Modern Hebrew.

During the 1800's, there was a revival of interest in the language of Hebrew on the continent and the use of the Latin alphabet was employed as a means of introducing the student to Hebrew. The reader is reminded that the Turkish dialect of Arabic was Romanized into the Latin alphabet during the time of Mustafa Kemel Ataturk. Recent movements in this direction concern other languages (some without alphabets), including Chinese, which is being Romanized by means of the Pin Yin system.

Because Hebrew, like Arabic, is a consonantal language, a system of pointing "nekudots" was developed to enable the reader to pronounce the words correctly when it ceased being used as a secular language. The Tiberian system of marking was developed to provide correct pronunciation of the Hebrew consonants, an operation that is taken over by the vowels in the Latin alphabet. The fact that Modern Hebrew can be adequately pronounced by employing the five vowels makes it possible for the correlation between the sound and the letter to be very high.[2] In fact, the relationship between the phonemes and the graphemes is much higher using the Latin alphabet than it is using the unpointed Hebrew, where the correct pronunciation frequently can be determined only from context. Indeed the Latin alphabet provides more clues to the correct pronunciation of Modern Hebrew than does the unpointed Hebrew.

It was the founding of the nation of Israel in 1948 and the adoption of Hebrew as a national language that was responsible for its employment, once again, as a secular vehicle, after being employed primarily as a liturgical language for over 1900 years. A second development that speaks in favor of Romanization is the increasing use of the computer in international communications where the left-to-right representation of information is the norm. It is also the usual mode of representation of the language of science and mathematics, as well as the international community of scholars. In spite of these recent trends, Hebrew has not been made available to those who would like to acquire a greater familiarity with the language, primarily because it employs a different alphabet. It has not taken its rightful place in the curriculum along with the other less commonly taught languages, such as Chinese, Swahili, and Arabic.[2]

By initially representing the language of Hebrew in the Latin alphabet, the problem of mastering another alphabet, the single greatest impediment to learning the language, is eliminated and mastery of the sound system can be quickly accomplished. Each of the following articles bears on a particular facet of language acquisition. After being reviewed for their selection of subjects, treatment, dependent measures, et cetera, an evaluation will be made. This

portfolio will conclude with a synthesizing statement indicating how the research has contributed to the development of this research and development product, now being prepared for operational field testing.

Navon, David and Shimron, Joseph (1981). The Distribution of Information Within Letters, Technical Report No. 215. Urbana, IL: Illinois University Center for the Study of Reading (ERIC ED 208 368).

Problem

To study the relative importance of various letter segments in letter recognition of the Hebrew and English/ Latin alphabet. To further verify or confirm the work of Javal (Huey 1908/1968) that there is a difference in the amount of information contained in the top half of a line of English as opposed to the bottom half. The reverse was found for Hebrew. Kolers (1969) indicated that the right half of the Roman letters are more important than the left in terms of identification.

Subjects

One experiment was conducted with 24 subjects and the English alphabet and the other with 15 subjects and the Hebrew alphabet. All participants were students at the University of Haifa who were familiar with the Hebrew alphabet and had been familiar with the Roman alphabet for at least ten years.

Method/Procedure

In each experiment, a letter was presented for identification but was preceded by a brief presentation of either a mutilated version of the target letter or a neutral pattern. Mutilations were accomplished by eliminating a specific segment, such as the lower horizontal stroke of the letter E. An S three-field Gerbrands Harvard-type tachistoscope attached to a voice activated crystal microphone with a timing device was used to record the latent response, the independent variable. The mutilations for English were 90 percent of a curved segment, one-half the height or all of the width of the English letter. In Hebrew, the mutlizations were 90 percent of a curved segment, one-half the height, and one-half the width of the Hebrew letter. All 26 letters of the English alphabet were employed, whereas only 21 letters were used from the Hebrew alphabet. The use of practice trils and random selection were employed to maintain the highest possible degree of internal validity.

Results

Of the three classes of variables defined for this experiment (informational variables, likeness variables, and letter variables), only the first category was found to be statistically significant. Two of the informational variables (uniqueness and distinctiveness) were found to have a significant effect--the first just in Hebrew, and the second

in both languages. Together they represent the only group that had a salient effect in both alphabets. The correlation coefficient between the facilitation scores and uniqueness in Hebrew letters was .57. It explained 32 percent of the variance in the multiple regression and was the first factor in the equation. In English, the correlation coefficient between uniqueness and latency was nonsignificant. In accordance with expectations, the more critical the eliminated segment, the less the altered version would activate the letter code in memory. The dependency of latency on the various factors varied considerably between the alphabets.

Conclusions

Some of the variables studied played their roles differently in the two alphabets investigated. A more substantive lesson is that letter recognition depends on the variety of alternatives in each language. The experiment mapped out the relative importance of various letter segments in two alphabets showing with a considerable degree of certainty that it is greatly mediated by informativeness of the segments, namely by their value for distinguishing between the target letter and other letters in the alphabet.

Critique

As the authors suggest, the validity of the experiment is subject to question because of the arbitrary selection of

fonts for both the Hebrew and English. Some of the statements raise questions about semantic meanings. For instance, "We recently found that mutilization of the top of a whole line of text was more harmful than mutilation of the bottom in mixed case English but not in Hebrew." The comparison alluded to is difficult to comprehend when there is no mixed case in Hebrew. Quite possibly this is a semantic misunderstanding on the part of the critic. The use of 24 subjects in one experiment and the use of 15 in another immediately calls into question the internal validity and the generalizability of findings. The above is cited to put in perspective a most challenging piece of research. The difficulty of learning another alphabet, such as Hebrew, is based upon many complex factors which need further investigation in the manner and in the direction pioneered by Navon and Shimron.

Items that would seem to have special need of further investigation are the following:

1. Which fonts of Hebrew and English alphabets would enable the learner of Hebrew as a second language the highest degree of recognition transfer? (This could be done both for print and cursive.)
2. How to most efficiently transfer the skill of left-to-right directional reading to right-to-left reading, as required in Hebrew and Arabic.

3. The value of Romanization in overcoming the initial learning problems for the beginning student of Hebrew as a second language or Hebrew for conversation.

Peleg, Rena (1981). Instrument Development for Informal Diagnosis of Hebrew as a Second Language Spelling Miscues, Pittsburgh, PA: University of Pittsburgh (unpublished thesis)(ERIC ED 207 326).

Problem/Hypothesis

To develop an informal diagnostic spelling test that would be helpful in determining the cause of spelling errors. It was assumed from previous studies of the spelling process [Wallin (1967), Venezky (1970), and Holmes and Peper (1977)] that the increasing level of difficulty would be represented by the following sequence: Spelling patterns by rule, function words and, finally, the stems with vowel alteration. It was hoped that this instrument would be helpful in providing individual instruction in spelling.

Subjects

Thirty students studying Hebrew as a second language at the Hillel Academy in Pittsburgh were selected. The 8 boys and 22 girls ranged in age from 11 years to 18 years and were selected from 300 students attending this Jewish middle and high school.

Method/Procedure

The subjects were divided into three groups. The diagnostic spelling test was administered to each of the

three groups in two consecutive sessions of 25 minutes each. The selected sample was considered representative of the children attending the school. A story previously unknown to any of the subjects was dictated to them in Hebrew and the words were written in cursive.

Results

Major spelling errors were in the following categories:

(a) Words borrowed from foreign languages;

(b) Pronominal suffixes;

(c) Adjective suffixes; and

(d) Spelling of prepositions when used as a prefix.

Pearson coefficients of r = .75 and r = .78 were obtained between the areas of difficulty. The findings were based upon statistical evaluations and indicated that the major problem for students in the Hebrew spelling system is the use of different graphemes to represent similar phonemes.

Conclusion

The Hebrew system of spelling might cause certain difficulties for students in the United States. The phoneme-grapheme correspondence is not a perfect one as a result of the Hebrew language characteristics mentioned in this study. These students might experience difficulties in spelling of Hebrew words as a result of the change in the direction of writing, the peculiarities of the Hebrew alphabet and vowel

system, specific pronunciation problems, the system of stems, and the different graphemes representing similar phonemes.

Critique

Although the purpose of the study is listed as development of a diagnostic spelling instrument, very little support is given to the selection of spelling words other than assigning them to one of the categories of pattern, function or stems. The investigator mentions the need to abbreviate the story given and has a tendency to bring in items of background interest in a rather irregular fashion. In spite of these limitations, the internal validity seems to be acceptable, although because of the nonrepresentative nature of the subjects, the results--no matter how valid--could not be generalized statistically to a general school population. The conclusions of the investigator, while not based upon statistical data of this investigation, are most revealing in and of themselves and as subjects for further research in a more typical population sample. Specifically salient are the following:

1. Problems caused by learning to read in a different direction.

2. Peculiarities of the Hebrew alphabet and vowel system.

3. Different graphemes representing different phonemes (6 pairs).

Levy, Yonata (1973). The Acquisition of Hebrew Plurals: The Case of the Missing Gender, Journal of Child Language, 10 (1):107-121.

Problem/Hypothesis

To determine how children acquire the formation of Hebrew plurals as indicated by a study of two-year-old native speakers of Hebrew. Of particular interest will be the presence or absence of gender in the children's handling of the noun plurals.

Subjects

The speech of Arnon, the author's eldest son, between the ages of 1:10 and 2:10 was closely monitored from the time he was at the two-word stage and inflections started to appear in his speech. Thirty-two nursery school children, sixteen boys and sixteen girls, aged 2:2-2:10 (mean 2:7) were tested. The children's parents had at least a high school education, permanent and mostly professional jobs. They were all first-born, raised in Jerusalem, and Hebrew was the only language spoken in their homes.

Discussion

The reader is presented with a brief but complete overview of the general patterns employed by the Hebrew

language in forming plurals. The importance of this facet of language development is critical as agreement is pervasive in Hebrew and is completely determined by the gender of the noun. All nouns are either masculine or feminine. The work of Stern and Stern (1928), El konin (1973), Brown (1973), and MacWhinney (1978) are cited to establish the fact that children understand and mark plurality in their speech from early on. Hebrew nouns in their plural form end in either /im/ [masculine] or /ot/ [feminine].

Method/Procedure

Longitudinal Study: Between the age of 1:10 and 2:10, the acquisition of Hebrew morphology (by Arnon) was closely monitored. In addition to taking detailed notes and periodic taping of his spontaneous speech, Arnon was frequently asked for the plural form of a particular noun. The technique used is one frequently used with older children [Berko (1958), Miller and Ervin (1964), and Derwing and Baker (1977)]. The longitudinal study was an extension of the naturalistic data collection approach. The observations were divided into four stages:

Stage A: Marked the appearance of plural forms;

Stage B: The use of the correct plural form for regular feminine plurals;

Stage C: Marked the beginning of working out the pluralization patterns for feminine /t/ ending nouns; and

Stage D: Marked an appreciation by Arnon of the full domain of the formal regularities of the system, including the movement of the stress and the internal vowel changes.

Cross-sectional Study: Elicitation procedures were essentially the same as those employed in the longitudinal study. Sixteen different items were used. The test with the 32 subjects was divided into two separate sessions with an interval of a few days between sessions. Twelve out of the 16 items were very familiar objects. There were animates and inanimates, masculine nouns and feminine nouns with a variety of feminine endings. Four items were given nonce names: two animate and two inanimate. Three nouns in the test form their plural in a way which is inconsistent with the rules, like /kos-kosot/.

Six predictions concerning the cross-sectional study were made based upon the findings of the longitudinal study.

Results

At the stage when children are well in control of the plurals of masculine nouns and of /a/-ending feminine nouns, they still have difficulty forming the plural of /t/-ending feminine nouns. This is especially true with word where

stress is the determining factor. Sex-gender is relatively ineffective in promoting the acquisition of inflected animate nouns. Children appear to have more difficulty in handling nonce nouns and the statistical evidence indicates they do better with nonce nouns that are animate as opposed to the inanimate.

In citing additional results, mention is made of the difficulty the children at this age have with vowel alternation and stop/spirant alternation, especially between b/v and k/x--a topic beyond the scope of this investigation, but one having major implications for further language proficiency.

These results accord well with the studies of the acquisition of gender in Russian [Popova (1973)], German [Bohme and Levelt (1979)], and French [Karmiloff-Smith (1979)]. In all these languages, as in Hebrew, children seem to arrive at a system of noun pluralization (or article assignment which is dependent on the gender of the noun as in French and German) via the fourth route; namely, on the basis of the phonological features of the noun singular. At age two or three, they appear to be insensitive to either the semantics or the syntax which the linguistic gender of nouns entails.

Critique

In this study, the results of the longitudinal study were used to make predictions concerning the cross-sectional study. Although the results of the cross-sectional study did bear out the results of the longitudinal study, it would appear to be a rather tenuous basis for predictions, especially since this longitudinal study involved only one subject and the investigator was the parent. Aside from the use of the McNemar tests, the statistical data are not very supportive of the conclusions. The examples used are excellent but the number mentioned in the article (16) is very limited and compounds the overall problem of the statistical validity. Perhaps the most interesting finding is that the results of this experiment are in accord with those conducted with children of similar ages in Russian, German, and French.

Especially revealing for the purpose of this portfolio was the language-wide simplicity of the plurals in Hebrew; /im/ for masculine plural and /ot/ for feminine plural.

The use of Romanization made it possible to explain the basic pattern of plurality in the Hebrew language, with great clarity.

Additional research is indicated to show when and how the children resolve the problem of vowel alternation and stop/spirant alternation in the formation of plurals. Perhaps a language-wide basis would be revealed similar to that which prevails in some dialects of Spanish in which certain stops become spirants when they are intervocalic.

Berman, Ruth (1982). The Acquisition of Agent and Instrument Noun in Hebrew, Papers and Reports on Child Language Development, No. 21, Stanford, CA: Stanford University Department of Linguistics, pp. 16-24 (ERIC ED 222 047).

Problem/Hypothesis

To investigate the development of devices used to coin agent and instrument nouns in Hebrew in children at various ages and adults. Predictions were made based upon semantic transparency, formal simplicity and productivity.

Subjects

Sixty children took part in the study, with 12 in each of five age groups: three-, four-, five, seven, and eleven-year-olds. The children were all middle-class second or third generation native speakers of Hebrew living in farm communities. The same task was also administered to 12 adults, mostly college students in their mid-twenties.

Method/Procedure

To elicit innovative nouns, the technique used by Clark Hect (1982) was employed to elicit either agent or instrument forms. The two types of questions can be roughly translated as follows for agents (with the verb to burst):

> "I've got a picture of a boy who likes to burst balloons. What could we call a boy whose job is to burst balloons?"

and for instruments (with the verb to break):

> I've got a picture of a machine that's used to break crayons. What could we call a thing that's used to break crayons?"

For each agent and instrument instruction, there was a corresponding picture of a person or a machine carrying out the action denoted by the verb. Each child was given 20 different verbs, 10 for agents and 10 for instruments selected from those commonly found in the vocabulary of three-year-olds.

To increase the likelihood of eliciting innovative nouns from the children, we chose activities for which there were no conventional agent or instrument noun in the language. Children were encouraged to make some response.

Results

Children preferred different word-formation options at different ages. The youngest, when they gave any innovative nouns at all, relied on present-tense forms for agents and instruments. Form age four on, everyone showed a strong preferenced for -an for agents, as predicted, and also relied heavily on -an for instruments. However, for instruments, -an competed with suppletive responses up to age five, with compounds at age seven, and with ma-CCeC for adults.

Conclusion

This study makes it possible for some cross-linguistic comparisons to be made:

1. The late emergence of compounding in Hebrew, unlike English or German, can be attributed to the low productivity of compounding in Hebrew;

2. Although different methods are used, in both languages, children start very early to acquire some devices for constructing new words; and

3. Across languages, speakers are attentive to a superordinate category subsuming both agents and instruments.

Critique

The limited statistical data showing the percentage of responses by age groups is supportive. Perhaps a major defect of this type of study is that the subjects are required to produce lexical items that are difficult to evaluate. There seems to be little doubt that by the age of 5 most children have mastered the sound system of their language and although how the formation of agent and instruments nouns is related to this fact is implied, unfortunately, it is not mentioned. Statistical data were not used to support the interesting cross-cultural conclusions.

Indications from this study are that the continued use of Modern Hebrew is working in the direction of simplification of agent and instrument noun formation.

Dromi, Esther and Berman, Ruth A. (1982). A Morphemic Measure of Early Language Development: Data from Modern Hebrew, Journal of Child Language 9(2):403-424.

Problem/Hypothesis

Discusses the establishment of a morpheme-per-utterance (MPU) index as opposed to the standard mean-length of utterance (MLU) for measuring the linguistic proficiency of two-to-three-year-old speakers of Hebrew.

Subjects

The method of measuring (MPU), as described in this research report, was tried out on 38 Hebrew-speaking children aged 2:0 to 3:0. The 17 boys and 21 girls had all lived since birth in kibbutz-type collective villages, and used Hebrew as their first and only language. These children live in a peer-group setting of four children in each "children's home." They spend only two-to-three hours a day with their families, and the rest of the time with professional caretakers, in a highly structured schedule of daily activities.

Method/Procedure

Given the nature of Hebrew as a highly synthetic language with rich bound morphology, an attempt was made to

establish a measure corresponding to the MLU for a language such as English. They decided like Brown (1973) that morphemes would be a better basis for measuring children's grammatical knowledge than words and proceeded to establish what would serve as a morpheme in their study. They examined verb structure and inflection, nouns and adjectives in various inflected form, such as feminine and masculine, and singluar and plural, to establish initial criteria for counting (MPU). A rationale was given for either counting an utterance as a morpheme or not so that future research could profit from this initial endeavor.

Solicitation procedures; Each child was audio-recorded in his or her home while interacting with the experimentor. The experimentor noted responses to a set of five stimulus-materials, such as a box of toys, a colored picture book, et cetera. The experimentor would solicit statements by asking questions such as, "What toys do we find in the box?" or by stating, "See what a nice picture there is here."

Scoring procedures: An overall MPU score was calculated for each subject to yield the average score of all the utterances that the subject produced in the course of one experimental session.

Since no measure for using a syntactico-semantic element was available in Hebrew, one was created as an

independent measure of the (MPU) model. This Hebrew model was patterned after the previous work of Lee and Canter (1971) and Crystal, Fletcher and Garman (1976). The 12-item syntactico-semantic measure was scored according to Cazden (1968) in Brown (1973).

Results

The speech samples of the 38 subjects, comprising a total of 4,292 utterances, contained 60 percent which were suitable for analysis. The relatively wide range of MPU values [1.7 to 5.9] reveals the measure as flexible and discriminating with respect to this unique group of two-to-three-year-old Hebrew speakers. The mean and the median are identical (3.2). The means of the MPU's were 2.3, 3.3, 3.1, 2.9, and 3.9, respectively. The correlation coefficients ranged from 0.55 to 0.82,and are all highly significant (P less than 0.001). The syntactico-semantic correlation with MPU was 0.81. These results clearly show that MPU is a better predictor of performance on the syntactico-semantic measure than age.

Conclusion

The MPU emerges as an effective indictor of the linguistic abilities of young children acquiring a language structurally very different from English and, moreover, the values of MPU for this study do not diverge from the MLU

values for English-speaking children in any dramatic way. One solution to using this measure in cross-linguistic data is offered by Slobin (1981). Children using different languages would be measured by MPU in their own language and then ranked. The system of ranking would enable you to compare rankings across languages without resorting to an absolute standard of MPU. Additional research is suggested to improve and refine the MPU instrument and additional research is needed before the results can be applied to a more heterogeneous population. Initially, it appears to be a most efficient and reliable measure of early language proficiency.

Critique

Although the authors indicate that many of the their decisions as to what constitutes a morpheme are arbitrary and the exact relationship between the morphemes and the phonemes is not discussed, it appears that the MPU is equally as valid in Hebrew as the MLU is for English. The statistical data are very lucid and there do not appear to be any major flaws in their approach to establishing the MPU as described.

Since the paper is concerned with Hebrew-speaking children and there is no specific concern with a second language as noted, there is only one additional area that is suggested for further research, and that is:

How this measure can best be adapted to adults who are learning Hebrew as a second language/Hebrew for conversation or since the MPU and MLU are so closely related, could the MLU measure be applied to the adult acquiring Hebrew as a second language?

CONCLUSIONS AND IMPLICATIONS

Each of the research articles mentioned is concerned with the basic problem of language acquisition. Each of the articles selected pinpoints a specific area of Modern Hebrew: (1) the alphabet, (2) spelling, (3) plural forms, (4) noun forms, or (5) a measure of language ability. This conclusion will indicate how Romanization can facilitate the teaching of Modern Hebrew to adult native speakers of English.

One of the biggest hurdles to overcome in learning Modern Hebrew in the traditional manner is the alphabet. Navon and Shimron show that much more is involved than just learning 22 new letters. It is much more a matter of learning to look in different places for clues as to the meaning of a letter. The recognition techniques that work in English do not work for reading Hebrew, because the language is written from right to left and the letters are formed to serve that orientation. Introducing the learner to Hebrew by means of the Latin alphabet will eliminate this problem.

The problem of spelling is one of unusual difficulty for those acquiring the language of Hebrew. Spelling in

Modern Hebrew is especially complex as some of the written letters have lost their uniqueness, and we end up with several pairs of letters that can be used to represent the same sound. In other words, there are two letter "t's," two letter "k's," and two letter "s's," for example. This confusion is eliminated by Romanization.

Plural endings in Hebrew are not complex, masculine plural words end in /im/, and feminine plural words end in /ot/. There are no neutral forms. A problem does exist in that certain words experience vowel changes or deletions in the stem when making the transition from singular to plural and this is most difficult to demonstrate in a consonantal language that does not use vowels. It is, on the other hand, easy to show when the language is Romanized (where the vowels are shown). For example, the word "katan" becomes "ktanim" in the plural. The first /a/ has obviously been omitted from the stem in the pluralized form.

Research on the acquisition of agent and instrument nouns by native speakers of Hebrew indicates that there is a tendency to employ a language-wide criteria in dealing with this category of lexical items. The form most frequently used for an agent noun ends in /am/. The tendency among adults is not to make a distinction between agent and instrument nouns in the traditional manner. Modern Hebrew

exhibits a trend toward simplification and this seems to be an example of it.

The final experiment is concerned with developing a measure for Hebrew similar to the mean length of utterance (MLU) used successfully with other languages. The peculiarities of Hebrew, a highly synthetic language with a rich bound morphology, suggested that a more accurate measure could be developed. The morpheme per utterance (MPU), was developed and evaluated to determine if it did indeed provide an accurate measure of language proficiency. By applying the concept of MPU to the acquisition of a second language for conversation, it is suggested that there is a certain merit in sentence length. The utilization of a pattern approach should facilitate that aspect of language development.

The information derived from this research will be incorporated into the research and development product previously mentioned.

The use of Romanization to be employed as an introduction to Modern Hebrew opens up a very interesting field of research.[8]

The evaluation of various systems of Romanization, such as the Kamelitic script developed by Professor Micahel

Avinor of the Technion, should be of value in increasing the use and understanding of the Hebrew language.*[9]

The Shalom Home Study Course in Modern Hebrew is a research and development product designed to demonstrate how Romanization can be employed to facilitate the acquisition of Modern Hebrew by the adult native speaker of English.[10] It is hoped that it will become a permanent part of the post-secondary educational curriculum.

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*Research and teaching materials from Dr. Micahel Avinor are on the way but will not arrive in time for incorporation in this portfolio.

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